

Draft : Environmental Impact Statement

Appendix D.8

Greenhouse Gas Calculations

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Table: Dredging Methodology data, source: Dredging Methodology_Revision 18072014

Dredging type	Area	Dredger type ---> Total sailing time (7.2) mins	TSHD Very soft to soft clay		TSHD Firm clay		Backhoe Stiff clay	
			Average hrs per week of dredging (hrs per week)	Total execution time (no. of weeks) mid-range	Average hrs per week of dredging (hrs per week)	Total execution time (no. of weeks)	Average hrs per week of dredging (hrs per week)	Total execution time (no. of weeks)
1		130						
2		108	151.2	2.72				
3		100	151.2	1.34				
4		92	151.2	3.64				
5		84	151.2	1.16	151.2	0.29		
6		72	151.2	3.91	151.2	1.99		
7		48	151.2	0.56	151.2	0.11		
8		36	151.2	1.75				
CALCULATED TOTAL			151.2	15.08	151.2	2.39		34.3
REPORTED TOTAL				15.15		2.41	100	34.3
REPORTED AND CALC HOURS				2,290.7		364.4		3,430.0

Construction Schedule (Appendix 11)

Phase	1	3	4
Boat	TSHD	Backhoe	TSHD
Dredging type	Soft and firm clays	Dredge area 1 and 6	Continue with areas 2,3,4 and 8
Time	3 weeks		

Table A: Scope 1 Emission Calculations - Equipment

Equipment	Power	Qty	Duration	No. weeks	Total no. hours	Av. Fuel Consumption	Est. Fuel Consumption	Fuel Type	Energy Content	Emission Factor	GHG emissions	Proportion	
	<i>kW</i>	<i>hp</i>	<i>(avg. hrs/week)</i>		<i>(includes total qty)</i>	<i>(L/hr)</i>	<i>(kl)</i>		<i>(GJ/KL)</i>	<i>(kgCO2/ GJ)</i>	<i>(tCO2e)</i>	<i>%</i>	
Landside vehicles													
Landside construction - Concrete Trucks (15t)		4	Refer to Construction_Trans		5,760.0	11.1	64.1	Diesel	38.6	69.9	173.0	0.8%	
Wharf upgrade - Concrete Trucks (15t)		7	Refer to Construction_Trans		2,646.0	11.1	29.4	Diesel	38.6	69.9	79.5	0.4%	
Landside construction - site vehicles (utes, 4wd)		46	25.0		866.7	12.5	10.8	Diesel	38.6	69.9	29.2	0.1%	
Wharf upgrade - site vehicles (utes, 4wd)		23	25.0		758.3	12.5	9.5	Diesel	38.6	69.9	25.6	0.1%	
Dredging Ships / Barges													
Dredging Tasks													
Trailer Suction Hopper Dredger (TSHD), is self-propelled (PRIMARY - Refer to Section 8.1, and 9.1)	6,826	5,090	1	151.2	17.6	2,655.1	979.8	2,601.5	HFO	39.7	73.1	7,552.7	37.1%
Backhoe Dredger (assume that this is in combination with a tug, or is self-propelled) (SECONDARY - Refer to Section 8.2, and 9.3)	1,985	1,480	1	100.0	34.3	3,430.0	352.6	1,209.4	HFO	39.7	73.1	3,511.2	17.3%
Small trailer (3 towed split barges, 1000m3, Yarra River of Van Oord) dredger			3	151.0	29.6	5,314.0	148.8	790.7	HFO	39.7	73.1	2,295.7	11.3%
Tug (with 15 tonne bollard pull, 1500BHP power)		1,500	2	118.0	34.3	8,094.8	164.7	1,332.9	HFO	39.7	73.1	3,869.9	19.0%
Other support vessels (Chapter 11)													
Survey vessel	Assume	1,200	1	151.2	34.3	5,186.2	119.9	621.9	Diesel	38.6	69.9	1,678.1	8.2%
Crew-boat	Assume	1,200	1	46.3	34.3	1,587.6	119.9	190.4	Diesel	38.6	69.9	513.7	2.5%
Other Construction equipment													
Piling Tasks (for foundations)													
Pile Driving Rig (from v1 of GHG)			1	43.2	32.0	1,382.4	19.0	26.3	Diesel	38.6	69.9	70.9	0.3%
Pile Delivery Barge (from v1 of GHG)			1	20.0	32.0	640.0	297.6	190.5	HFO	39.7	73.1	553.0	2.7%
Total							7,013.3				20,352.3	100%	

Dredging volumes (Total) (m3)	Very soft to soft (m3)	Firm (m3)	Stiff (m3)
3,585,542	3,231,492	354,050	
764,074	338,806	105,355	319,913

Key Assumptions

Working hours are 6:30am-6:30pm 6 days per week for land-based construction activities.
 Equipment will be used approx. 60% of that time
 Av.hours of operation for dredges taken from Prodredging technical note 2/10/13, and based on the Technical Revision (April 2014)
 Mains electricity is not expected to be utilised for construction activity, therefore there are no Scope two emissions for the Project

Table B16.5a: Estimated Construction Phase GHG Emissions

Emission Source	Estimated fuel consumption (kl)	Fuel type	GHG Emissions (tCO2e)	% of construction emissions
Concrete Trucks	94	Diesel	252	1.2%
Site vehicles (utility, 4WD, etc)	20	Diesel	55	0.3%
Dredging - Trailer Suction Hopper Dredger	2,601	Heavy fuel oil	7,553	37.1%
Dredging - Backhoe Dredger	1,209	Heavy fuel oil	3,511	17.3%
Dredging - Hopper barges and trailer dredging	2,124	Heavy fuel oil	6,166	30.3%
Dredging - Support, survey and crew boats	812	Diesel	2,192	10.8%
Construction (piling) - Pile driving rig	26	Diesel	71	0.3%
Construction (piling) - Pile delivery barge	190	Heavy fuel oil	553	2.7%
TOTAL	7,077		20,352	
	952	Diesel	2,570	
	6,125	Heavy fuel oil		

Comparison Dredging Projects

Volume Dredged m3	Carbon Emissions tCO2e	Ref
Port of Gladstone - Western Basin	36,000,000	300,500 http://www.dsdp.qld.gov.au/resources/project/port-of-gladstone-western-basin-dredging-disposal-project/executive-summary.pdf